

## PATENT SPECIFICATION

DRAWINGS ATTACHED

1.166.085

1.166.085



Date of Application (No. 53333/66) and filing Complete Specification: 29 Nov., 1966.

Application made in Germany (No. Sch 39229 IXc/43b) on 7 July, 1966.

Complete Specification Published: 1 Oct., 1969.

Index at acceptance:—G4 V (P9, P10)

International Classification:—G 07 f 7/02

## COMPLETE SPECIFICATION

## Improvements in or relating to Automatic Vending Machines

We, SCHEIDT & BACHMANN Gmb H, a German Body Corporate, of Breitestrasse 132, Rheydt, Rhineland, Germany, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to automatic vending machines and in particular to automatic dispensing apparatus for liquid fuels.

Vending machines associated with petrol pumps are, for instance, so constructed that, on insertion of a particular amount of money in the form of coins or banknotes, the petrol pump will deliver a predetermined quantity of fuel. If the pump itself delivers a constant amount of fuel per unit of time the pump control system operates purely in dependence on time. Otherwise, a quantity-measuring device is provided which switches off the fuel pump when a quantity of fuel has been delivered corresponding to the sum of money inserted.

This kind of automatic vending machine is subject to many disadvantages. The motorist usually has only a limited number of suitable coins and moreover can never accurately estimate the amount to be paid in order to fill the vehicle tank as completely as possible. With a prematurely filled tank only those coins or banknotes can be returned which have not been encashed so that residual amounts which are smaller than the value of coins or banknotes paid in, the so-called change, cannot be paid back. A further disadvantage of this kind of apparatus is that a relatively large amount of cash may be stored in the apparatus during long week-ends thus offering a temptation to burglary. Finally, there is also the disadvantage that such automatic dispensing apparatus may be operated by counterfeit coins or coins of lower value and of other currencies so that the owner of the automatic dispensing apparatus

does not receive the cash value of the fuel dispensed.

Another kind of vending machine for liquid fuels is known which operates with credit cards which are handed to the customers by the owners of the filling station. These credit cards are introduced into the control unit associated with the petrol pump and the control system of the pump delivers the required tank filling and records the amount removed on the credit card. There is again the disadvantage that the credit cards are not secured against loss or misuse and their use has the disadvantage that accounting for the amount of fuel obtained takes place only subsequently and requires a well-organized and expensive book-keeping and cash accounting system. There is also the risk that users may become insolvent and escape payment for fuel obtained.

It is an object of the invention to provide a vending machine which is independent of the amount of coinage available to the particular customer and with which a particular container, e.g. a vehicle fuel tank, can be completely filled without any surplus amount of goods or money being left over. The vending machine according to the invention also avoids the storage of large amounts of cash and protects the owner of the machine to a very considerable extent against the loss of value paid for the goods and against difficulties when subsequently cashing such value.

According to the invention, there is provided an automatic vending apparatus comprising a customer's card having a magnetic store for magnetically recording indicia representative of a monetary value; and a vending machine including a control unit into which the customer's card can be inserted to allow the dispensing of goods, which control unit comprises (a) actuating means for permitting the dispensing of goods from the vending machine, (b) price calculating means actuated by operation

45

50

55

60

65

70

75

80

85

of the machine to dispense goods, to transmit a number of pulses, each indicative of a fixed monetary unit, equal to the price of the goods dispensed, and (c) magnetic recording and storage means for magnetically recording in a magnetic store indicia representative of the monetary value of the customer's card inserted into the control unit, cancelling the indicia on the customer's card, receiving the pulses from the price calculating means, subtracting the monetary value represented by the pulses from the monetary value represented by the stored indicia, and, after dispensing of the goods has ceased, recording in the magnetic store of the customer's card indicia representing the remaining monetary value.

Using the apparatus according to this invention, it is possible for the customer to obtain any desired amount of goods, for example liquid fuel, from the automatic vending apparatus, the quantity of goods obtainable not being limited by the availability of appropriate coins or banknotes and the disadvantage of the inability to return change being eliminated. Moreover, the owner of the automatic vending apparatus is protected against theft because it is not necessary to insert any form of cash into the control unit.

Vending machines having control units operable by coins, banknotes or credit cards (but not customer's cards of the type referred to above) are well known, as has been acknowledged above. Further, items of apparatus suitable for, or easily adapted for, use as the actuating means, the price calculating means, and the magnetic recording and storage means of the apparatus of the invention also are well known *per se* although not in combination in a control unit of a vending machine as proposed by this invention. Any person skilled in the art will therefore have no difficulty in constructing a vending machine of the present invention from commercially available items of apparatus.

The customer's card of the invention may be any card having a magnetic store and being adapted for insertion into the control unit so that the indicia stored on the card can be read, erased and then replaced by the recording and storage means of the control unit. Advantageously, the magnetic store may be constituted by a piece of magnetic track.

In order to prevent misuse of the customer's card the invention furthermore proposes that the customer's card be provided with a second magnetic store for magnetically recording an invisible code number, the user having to select on a keyboard of the control unit a corresponding number before the control unit releases goods for delivery. Misuse is prevented since only the owner of the card knows the code number.

As a preferred embodiment, the control unit is so arranged that the number to be selected by keys corresponds to the complementary number representing the next higher decimal

unit so that the code number store of the control unit is set to zero when both numbers coincide.

The apparatus of the invention may comprise, in addition to the essential features and a keyboard, a start button and a stop button. The customer's card may be provided with holes to receive guide pins of the control unit in order to ensure reliable location and alignment of the card for the scanning and magnetising process.

The magnetisable part of the customer's card can be disposed between the holes for the guide pins and a section provided above the aforementioned part for accommodating data in clear language relating to the issuer and owner respectively of the card.

Further the control unit can be coupled with a strip puncher and a decoding device by means of which a subsequent recording and monitoring of the automatic vending process is made possible.

The invention will be described hereinafter with reference to the accompanying drawings, in which:—

Figure 1 is an example of a suitable form of customer's card;

Figure 2 is a diagrammatic view of the code selected as an example, and

Figure 3 is a diagrammatic front view of a petrol pump which together with the customer card of Figure 1 constitutes a vending apparatus in accordance with the present invention.

The customer's card 1 shown in Figure 1 is provided with a section 2 to receive printed information of the personal particulars of the card owner and of the issuer of the customer's card. These entries are appropriately made in clear language. In the lower part, the customer's card 1 is provided with holes 5, 6 and 7 which serve to accommodate guide pins of the control unit. Two magnetic tracks 3 and 4 are provided between the aforementioned holes 5, 6, 7. The prepaid amount, in a fixed monetary unit is magnetised on section 3 of the card in invisible form by means of a code. A personal code number in the same code and relating to the card owner is magnetised on the section 4.

Figure 2 shows the layout of a two-out-of-five code chosen as an example for the description. Each number is represented by two magnetic dots, the arrangement of which in different ones of five possible positions provides the numbers 0 to 9. According to this code example, the customer's card of Figure 1 represents the code number 1550325 and the prepaid amount of 1,500 monetary units.

Figure 3 is a front view of a petrol pump 13 having a control unit 8. The front panel of the control unit 8 is provided with a slot 9 for the insertion of the customer's card 1. A keyboard 10 with number buttons 0 to 9, a start button 11 and a stop button 12 are

also provided. An electronic circuit, not shown on the drawing, and consisting of known structural units, provides the monitoring and evaluation of each use of the automatic dispensing apparatus by means of a customer's card.

The method of operation of the apparatus described hereinafter, it being assumed that the vending machine is a dispensing apparatus for liquid fuel.

To initiate operation of the automatic dispensing apparatus the user pushes his customer's card into the slot 9 of the control unit 8. He depresses the start button 11, whereupon the customer's card is retained by means of guide pins, not shown, which engage in the holes 5, 6 and 7. The customer's card user then selects on the keyboard 10 a code number which has been confidentially entrusted to him by the issuer of the customer's card 1. The aforementioned code number is preferably a multi-digit number and may for example correspond to the last five digits of the code number magnetised in section 4 of the customer's card 1. However, preferably it is made up of numbers which in each case complement to 10 the numbers of the code number magnetised in section 4. In the selected example of a code number 1550325 the complementary number would be 99 550 785.

In the selected example the bona fides of the card user are tested in the control unit 8 which scans and stores the numbers of the field 4, i.e. 1 550 325, when the customer's card 1 is inserted. If subsequently the user keys the correct complementary number 9 550 785 on the keyboard 7 it means that all stored digits of the code number store of the control unit 8 are set to 0. The control unit 8 then switches on the dispensing device, that is to say the pump of the automatic dispensing apparatus. If the code number and complementary number do not correspond, the dispensing device will not come into operation and the customer's card 1 is ejected from the control unit 8.

On completion of a correct monitoring cycle the control unit 8 will scan the amount of 1,500 monetary units magnetised and encoded on section 3 and store the said amount in a credit store. After storage, the magnetisation of the section 3 on the customer's card is cancelled from the card.

The pump 13 will then start and the customer can withdraw any desired amount of fuel, in the example shown up to a value of 1,500 monetary units. The customer controls the dispensing by means of a conventional hosecock unit. During the dispensing process the price computer of the automatic dispensing machine transfers accounting pulses to the control unit 8, each pulse corresponding to one monetary unit. These pulses are subtracted from the stored amount of 1,500 units. For example, if the customer completely fills his fuel tank and consumes an amount of 1,238

monetary units, the credit store at the completion of the dispensing cycle will have the new amount of 262 monetary units recorded on it. The customer terminates the dispensing process by replacing the hosecock unit and he also depresses the stop button 12.

After depressing the stop button 12, the control unit 8 magnetises the residual amount of 262 monetary units in the appropriate code in section 3 of the customer's card 1. This amount will therefore be available to the customer for a further withdrawal of fuel. The customer's card is then unlocked and ejected.

For monitoring the equipment it is advantageous but not absolutely necessary if a strip puncher and decoding device of known kind are coupled with the control unit 8 which is constructed as an electronic computer. By the aforementioned extension of the device according to the invention, each use of the automatic dispensing machine by means of a customer's card would cause the code number according to section 4 as well as the initial and final amount according to section 3 of the customer's card 1 to be punched, the punched strip being available for evaluation at certain intervals.

It will be evident that the apparatus according to the invention may be used for automatic vending machines supplying goods other than liquid fuel, provision being made for pulses to be subtracted from the stored monetary value according to the price of individual articles constituting the goods delivered.

#### WHAT WE CLAIM IS:—

1. An automatic vending apparatus comprising a customer's card having a magnetic store for magnetically recording indicia representative of a monetary value; and a vending machine including a control unit into which the customer's card can be inserted to allow the dispensing of goods, which control unit comprises (a) actuating means for permitting the dispensing of goods from the vending machine, (b) price calculating means actuated by operation of the machine to dispense goods, to transmit a number of pulses, each indicative of a fixed monetary unit, equal to the price of the goods dispensed, and (c) magnetic recording and storage means for magnetically recording in a magnetic store indicia representative of the monetary value of the customer's card inserted into the control unit, cancelling the indicia on the customer's card, receiving the pulses from the price calculating means, subtracting the monetary value represented by the pulses from the monetary value represented by the stored indicia, and, after dispensing of the goods has ceased, recording in the magnetic store of the customer's card indicia representing the remaining monetary value.

2. An automatic vending apparatus according to claim 1, wherein the vending machine is a liquid dispensing machine.

3. An automatic vending apparatus accord-

5 ing to claim 1, wherein a second magnetic store is provided on the customer's card to magnetically record an invisible code number and the said number is compared in the control unit with a number fed into the said control unit by the customer so that the actuating means permits the release of goods only if the code number and the number fed into the said unit by the keys are related one to the other in a predetermined manner.

10 4. An automatic vending apparatus according to claim 3, wherein the number to be fed into the control unit by operation of the keys is complementary to the code number to the next higher decimal unit so that the code number store of the control unit is set to zero when the numbers are correctly related.

15 5. An automatic vending apparatus according to any of claims 1 to 4, wherein the control unit is provided with a keyboard, a slot to receive a customer's card, guide pins to locate a customer's card, inserted in the slot by engaging in holes therein, a start button to initiate the action of the control unit and a stop button to initiate the recording on the customer's card of the residual monetary value.

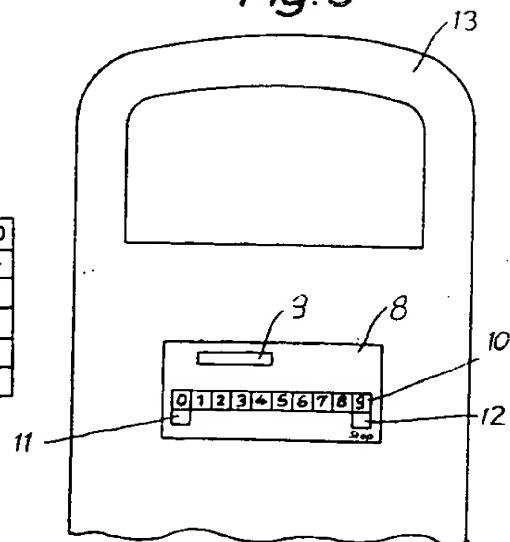
20 6. An automatic vending apparatus accord-

ing to claim 5, wherein the customer's card includes a part disposed between the pin-engaging holes therein which is magnetisable to receive the indicia representative of the monetary value and the code number, and another part to receive visible data relating to the issuer of the card and the person to whom it is issued.

30 7. An automatic vending apparatus according to claim 4 or 5, wherein a strip puncher and a decoding device are coupled with the control unit to provide a record from which the deliveries made by the vending machine can be subsequently checked.

40 8. An automatic vending apparatus comprising an automatic vending machine and customer's card, for controlling the operation of said vending machine, substantially as described with reference to, and as shown in, the accompanying drawings.

45  
For the Applicants:  
F. J. CLEVELAND & COMPANY,  
Chartered Patent Agents,  
Lincoln's Inn Chambers,  
40/43 Chancery Lane,  
London, W.C.2.



**Fig. 2**

1	2	3	4	5	6	7	8	9	0
.				.			.		.
	.				.			.	.
		.				.	.	.	
			.	.	.	.			
.	.	.	.						

THIS PAGE BLANK (USPTO)